



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/668,833

09/23/2003

Michael T. Rowan

68865.001002

4989

21967 7590 05/22/2008

HUNTON & WILLIAMS LLP  
INTELLECTUAL PROPERTY DEPARTMENT  
1900 K STREET, N.W.  
SUITE 1200  
WASHINGTON, DC 20006-1109

EXAMINER

GU, SHAWN X

ART UNIT

PAPER NUMBER

2189

MAIL DATE

DELIVERY MODE

05/22/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/668,833	<b>Applicant(s)</b> ROWAN ET AL.	
	<b>Examiner</b> Shawn X. Gu	<b>Art Unit</b> 2189	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This final Office action is in response to the amendment filed on 28 February 2008. Claims 1-29 are pending. All objections and rejections not repeated below are withdrawn.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Per claims 1, 14, 21 and 23, the claims recite “continuously indexing by timestamp old data ... prior to execution of each write command”. However, the Applicant’s disclosure clearly teaches a copy-on-write process (see specification, paragraph [0033]). Nowhere in the Applicant’s disclose is it shown that the time-stamping of old data is performed before the execution of a write command. Since the claims clearly state that the time-stamping of old data is done after copying the old data

to be overwritten since the time-stamping is performed in the time store, a copy-on-write process would suggest that there is already a write command being executed.

Per claim 14, on lines 4-5, and claim 23, on lines 5-6, the claims recite the newly amended limitation "recording, automatically, all write commands directed to the storage system". This limitation can be interpreted to construe that the Applicant's invention is capable of storing/recording the actual write commands in the claimed storage system as opposed to merely receiving/intercepting the write commands as previously claimed. The Applicant submitted in the Remarks filed 28 February 2008 that support for this limitation can be found in paragraphs [0030], [0033], [0066], [0067], [0076] and Figures 1, 4 and 5 of the published application (see Remarks, page 15, first paragraph of the communication filed 28 February 2008). However, the above cited paragraphs and figures as well as the rest of the Applicant's disclosure fail to disclose any support for "recording ... all write commands directed to the storage system".

All dependent claims are rejected as having the same deficiencies as the claims they depend from. Appropriate correction is required.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 6-12, 14-20, 25 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Per claim 6, the limitation “specifying ... a time” is indefinite since claim 1 already recites “a specified time”. It is unclear whether the time specified in claim 6 is the same specified time in claim 1.

Per claims 7-12, the limitation “the time” is indefinite since claim 1 recites “a specified time” and claim 6 recites “specifying ... a time”.

Per claim 14, the claim recites “a specified time period” on the sixth to last line and “the specified time” on the third to last line. The instant claim’s limitation “the specified time” lacks sufficient antecedent basis.

Per claim 17, the limitation “the time” is indefinite since claim 14 recites “a specific time period” and claim 6 recites “specifying ... a time”.

Per claim 25, the claim recites “the time is explicitly specified” and claim 23 recites “a specified time period”. The instant claim’s limitation “the time” lacks sufficient antecedent basis.

All dependent claims are rejected as having the same deficiencies as the claims they depend from. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

Art Unit: 2189

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-10, 13-19 and 21-29 are rejected under U.S.C. 102(e) as being anticipated by Wu et al. [US 6,981,114 B1] (hereinafter "Wu").

Per independent claim 1, Wu teaches a storage management system for backing up a storage system comprising a plurality of units of storage (blocks, Col.4, Ln.57-60), the storage management system comprising:

at least one current store representing a current state of the storage system (Fig 2, Mirrored Volumes 240; see col. 5, lines 9-12, "synchronized to the original volume"); and

at least one time store (see Fig. 2, Backup Device 250 and Modification Log 260);

wherein the storage management system automatically records information associated with all write commands directed to the plurality of units of storage, each write command comprising an instruction to overwrite at least one of the plurality of units of storage with new data (Col.6, Ln.14-25, "each modification"; col. 4, lines 63-67, "whenever the original volume is modified, a copy of the pre-modification value ... may be stored"); and

wherein the storage management system copies, prior to overwriting the at least one unit of storage, old data present at the at least one unit of storage into the at least one time store, wherein old data is time-stamped (Col.6, Ln.14-25 and Ln.45-56, pre-modification values of modified blocks are backed up, also see Col.8, Ln.19-31 and col. 4, lines 63-67 for "copy-on-write"), thereby continuously indexing by timestamp old data

Art Unit: 2189

to be overwritten with new data prior to execution of each write command (see col. 6, lines 14-35 and col. 8, lines 19-31; each entry of old/pre-modification data for each modification is continuously recorded and time-stamped, the time-stamped data are indexed and retrieved in part with the timestamp data, see the restoration process described in col. 10, lines 12-67); and

wherein the storage management system is further configured to identify old data that were present in a specified portion (col. 4, lines 57-67, modified block) of the plurality of units of storage during a time prior to being overwritten based at least in part on the timestamp (the restoration process identifies the pre-modification values for the modified blocks after the point in time to be restored to; see col. 5, lines 46-58, col. 6, lines 14-67, col. 7, lines 17-25, col. 8, lines 19-31, col. 9, lines 40-61 and col. 10, lines 12-55).

Per independent claim 14, it is clear the method of the claim is already substantially disclosed in claim 1 and must be performed by claim 1's storage management system. Wu further teaches recording, automatically, all write commands directed to the storage medium (see Col.6, Ln.14-25, "each modification"; since each write command is received, the commands must be at least temporarily stored/recorded by the receiving means of the storage system shown in Fig. 1 and 2); and identifying old data that were present in a specified portion of the plurality of units of storage during (in Wu the specified portion is the volume being restored) a specified time period (see col. 10, lines 32-67, the time period between T1 and T2) prior to being overwritten based at least in part on the timestamp (see col. 8, lines 19-50, timestamp for each entry), the

time store is identified as the location if the data was overwritten after the specified time (since the limitation “the specified time” is indefinite, Wu’s T1 is the specified time since it is the time the restoring process is targeting), and the current store is identified as the location if the data was not overwritten after the specified time (see col. 10, lines 12-67 and Fig. 2; snapshots are stored in the current store/Mirrored Volumes 240; the modification log provides the modifications between T1 and T2, T2 is subsequent to T1; snapshot B created at T2 and retrieved from the current store/Mirrored Volumes 240 for restoration, and the time store/modification log is accessed for the pre-modification values for each modification between T1 and T2, the two sources of data are merged to recreate the snapshot at T1; therefore the snapshot data is used for a particular block if there is no modification between T1 and T2, otherwise pre-modification data retrieved from the modification log is used). It is noted that this rejection is made in view of the 112(2) rejection set forth above.

Per independent claim 23, it is clear the claim is already substantially discloses as described above in claims 1 and 14. Wu further teaches a computer readable medium having the code performing the limitations of the instant claim (Col.6, Ln.36-37; Col.11, Ln.28-39).

Per claim 2, Wu teaches the storage system further comprises one or more physical storage devices (Fig 2, Primary Volumes 220, Mirrored Volumes 240, and Backup Device 250) on which data of the storage system is stored.

Per claims 3 and 15, Wu teaches an address for accessing the storage system comprises a device identifier (Wu’s backup system must be able to identify the physical



devices in claim 2 in order to perform read/write operations) and a location identifier (the block to be written must be identified, Col.4, Ln.57-60).

Per claim 4, Wu teaches the device identifier identifies a physical storage device (Wu's system must be able to identify the physical device which contains the requested data).

Per claim 5, Wu teaches the device identifier identifies a logical device (logical volumes, Col.4, Ln.51-60).

Per claims 6, 16 and 24, Wu teaches the digital content of the storage system can be access by specifying an address and a time, and the time specifies that data retrieved from the address is the most recent data that was written to the address at or before the time (restoration to original volume at a point in time, Col.5, Ln.46-58 and Col.6, Ln.65-67; an address and a time must be specified to retrieve the data needed to reconstruct the volume to a specific time, the data retrieved must be the most recent data at or before the time in order to correctly reconstruct the volume to a particular point in time).

Per claims 7, 17 and 25, Wu teaches the time is explicitly specified in a request to access a unit of storage ("request to restore ... to its state at time T1", see Col.10, Ln.31-43 and Col.9, Ln.45-61).

Per claim 8, Wu teaches the time is specified in a command to the storage system separate from a request to read a unit of storage (Wu's teaching is implemented in a file system with a database, see Col.6, Ln.36-37, Col.11, Ln.28-39, therefore the time specification and the actual file system/database level read request are separate).

Per claims 9 and 18, Wu teaches the storage management system creates a virtual device (snapshots are time-stamped; see Col.5, Ln.50-58, Col.6, Ln.46-48), wherein the time is specified when the virtual device is created (Col.6, Ln.46-48), and is applied when the virtual device is accessed (col.10, Ln.31-43, snapshots and their timestamps are used for reconstruction and restoration, Col.9, Ln.45-61, snapshots and modification log records are identified by creation time).

Per claims 10 and 19, Wu teaches new data is written to the virtual device without overwriting data that was written to the storage system after the time specified when the virtual device was created (a snapshot only stores data that were present in the storage system before or at the time when it was created, and Wu's system can hold a number of snapshots before deleting old ones when new ones are created; see Col.7, Ln.6-7).

Per claim 13, Wu teaches the units of storage are blocks (Col.4, Ln.57-60).

Per independent claim 21, it is clear that the apparatus of the claim is already substantially disclosed as described above in claims 1, 6, 9, 14 and 23 by Wu, which further teaches a storage appliance (Fig 2, all components shown except CPUs 204, wherein the physical storage devices include Primary Volumes 220, Mirrored Volumes 240 and Backup Device 250) that interfaces with a computer, and at least one current store (Fig 2, Mirrored Volumes 240) and at least one time store (Fig 2, Backup Device 250) comprised within the storage appliance.

Wu further teaches that the at least one current store maintaining a current mirror copy of digital content in the one or more physical storage devices (see Fig. 2, “Mirrored Volumes” and Col.5, Ln.5-45).

Per claim 22, it is clear the claim is already substantially disclosed by claims 6, 21 and 23 as set forth above.

Per claim 26, Wu further teaches the at least one current store (Fig 2, Mirrored Volumes 240) maintains a current mirror copy of digital data stored in the plurality of units of storage (Col.5, Ln.5-45), and wherein the at least one time store (Fig 2, Backup Device 250) contains the old data and a time-stamped record of the old data (Col.6, Ln.14-37).

Per claim 27, Wu further teaches that after the old data is copied to the at least one time store, the at least one unit of storage is overwritten with the new data (pre-modification values are backed up before being overwritten, Col.6, Ln.14-37; also see “copy-on-write”, col. 4, lines 63-67), and the current mirror copy in the at least one current store is updated with the new data (writes to the original volumes also update the mirrored volumes, Col.5, Ln.5-27; also see “copy-on-write”, col. 4, lines 63-67).

Per claims 28 and 29, it is clear the claims are already substantially disclosed as described in claims 26 and 27,

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2189

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 11, 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu, in further view of "UNIX in a Nutshell" [Daniel Gilly and the staff of O'Reilly & Associates, Inc] (hereinafter "Gilly").

Per claim 11, Wu already substantially discloses the claims as described above, but does not clearly state that a command to the storage system specifies that the time is implicitly a current time. However, the teaching of UNIX is presented by Wu (Col.3, Ln.45-47). It is clear that implicitly providing the current time as the default when accessing a system wherein time is a necessary argument simplifies the command syntax and increases the user-friendliness of the system since the current time is one of the most frequently used time in such commands. Gilly teaches a "cal" command in the UNIX operating system (Pg. 2-10), wherein a calendar for the current month is displayed to the user when the command is sent to the system with no arguments, thereby implicitly specifying the current time as the default argument. Therefore it would have been obvious to one ordinarily skilled in the art at the time of the applicant's invention to incorporate the feature in Gilly's "cal" command into Wu's command in order to simplify command syntax and increase user-friendliness of the Wu's system.

Per claims 12 and 20, Wu already substantially discloses the claims as described above, but does not specifically state that the time is specified relative to the current time. However, Wu teaches the use of UNIX operating system (Col.3, Ln.45-47). It is clear that specifying a time relative to the current time when accessing data provides a

useful condition for the user to restrict the access to a certain group of data without knowing the exact time value, thereby increasing the user-friendliness of the command and the system. Gilly teaches a “find” command in the UNIX operating system (Pg. 2-47 and 2-48), wherein a time relative to the current time is specified as an argument to access data. Therefore it would have been obvious to one ordinarily skilled in the art at the time of the applicant’s invention to incorporate the feature in Gilly’s “find” command into Wu’s command in order to increase user-friendliness of the Wu’s system.

### ***Response to Arguments***

10. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection. The claims are taught by Wu and Gilly as set forth above.

Regarding the Applicant’s first argument that Wu does not teach a current store representing a current state of the storage system (see Remarks, page 16, second paragraph to page 17), the Examiner has explained in the rejection of claim 1 set forth above that Wu's current store is the Mirrored Volumes 240 since the mirrored volumes are synchronized with the original volumes and each update to the original volume is reflected on the mirrored volumes.

Regarding the Applicant’s second argument that Wu does not teach “the time store is identified as the location if the data was overwritten after the specified time, and the current store is identified ... after the specified time” (see Remarks, page 18, second paragraph to page 19, first paragraph), the Examiner notes that the Applicant’s

argument is based on the previous argument that Wu does not teach a current store. Therefore this argument is overcome by virtue of the Examiner's response to the first argument set forth above.

Regarding the Applicant's third argument that Wu fails to teach "continuously indexing by timestamp old data to be overwritten with new data prior to execution of each write command" (see Remarks, page 20), the Examiner has pointed out that this limitation fails to comply with the written description requirement and issued the 112(1) rejection as set forth above and made a new ground of rejection as necessitated by the amendment.

The Applicant further argued that all dependent claims are allowable by virtue of their dependence of the independent claims. Since all arguments directed to the independent claims have been traversed by the Examiner as set forth above, all dependent claims stand rejected.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

Art Unit: 2189

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shawn Gu whose telephone number is (571) 272-0703. The examiner can normally be reached on 9am-5pm, Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald Bragdon can be reached on (571) 272-4204. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2189

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/SHAWN X GU/

Shawn X Gu  
Patent Examiner  
Art Unit 2189

19 May 2008

/Reginald G. Bragdon/  
Supervisory Patent Examiner, Art Unit 2189